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# Alternative Solutions for Determining Village Funds Using Weight Product Method

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**Abstract.** Based on the Minister of Home Affairs Regulation No. 113 of 2014 concerning Village Financial Management, the management of village funds must be carried out in a transparent, accountable, participatory, orderly, and budgetary discipline. Village fund management starts from January 1 to December 31 of the current year as outlined in the Village Budget (APBDesa). Village budget consists of village income, village expenditure, and Village Financing. The current village fund management mechanism is felt to be too convoluted and filled with obscurity. For example, the measurement for village fund recipients is still based on the results of deliberations. The results of the deliberations that are produced make it possible to have political elements or like-dislike factors. The result will be far from equal distribution and right on target. From this description, we need a tool that is used to help provide a fair decision regarding the recipient of village funds. The tool is a tool that is not influenced by things that cause no equalization and only requires a short time in its processing. So that the recipients of village funds are quickly identified by looking at several criteria. This study provides a solution for determining the recipients of village funds using the Weight Product method. Weight Product Method is one method often used to solve the problem of decision making with many attributes or criteria (MADM). This method is more efficient than some other methods in solving the problem of decision making with many attributes or criteria (Multi Attribute Decision Making). The criteria used in this study include: Poverty rates, area size, geographical difficulties, and infrastructure.

## 1. Introduction

Village fund management in the village becomes an important and fundamental aspect that must be understood and owned by stakeholders at the village government level (pemdes), especially village apparatus in realizing transparency and accountability of village finances. The basic principles of village financial management [1], starting from the planning stage to reporting and accountability of village finances and the duties and responsibilities of managing officials. Like PNPM Mandiri in Rural Areas this program aims to overcome the problems of public facilities and poverty alleviation [1].

Based on the Minister of Home Affairs Regulation No. 113 of 2014 concerning Village Financial Management, the management of village funds must be carried out in a transparent, accountable, participatory, orderly, and budgetary discipline. In the period of village fund management starting from January 1 to December 31 of the current year as outlined in the Village Budget (APBDesa). The village budget consists of village income, village expenditure, and village financing.



Planning in the management of village finances was prepared by the village secretary (sekdes). In the planning mechanism for managing village finances, the village secretariat first drew up a Village Regulation Plan (Raperdes) for the APBDesa. Then, the village head (village head) submits the APBDesa Raperdes to the Village Consultative Body (BPD) for discussion and mutual agreement. APBDesa Raperdes agreed upon, delivered to the regents or mayors through the camat. The regent or mayor then determines the results of the APBDesa Raperdes evaluation. The Camat can also evaluate the APBDesa Raperdes based on the delegation of authority from the regent or mayor.

The problem taken from this research is how to determine village funds to reach the right target, which is really in a location that really needs it. In many cases village funds that should have been received by the rightful recipient are even the unauthorized parties who enjoy them. Starting from the mechanism of village fund management which is still felt to be convoluted and full of obscurity. This started when determining the recipient of the village fund [2]. As far as researchers know, the recipients of village funds come from the results of deliberations. In the current political year, it is possible that the outcome of the deliberations is political. The like-dislike factor also has the potential to lead to mis-targeting to determine the recipients of village funds.

To overcome these problems requires a tool that is not affected by things that cause uneven distribution of village funds or misdirected. The tool is only independent and has the intelligence to help provide fair decisions regarding recipients of village funds by looking at several criteria. Based on references from several studies that have implemented this method, including research conducted applying the WP method to improve the effectiveness and efficiency of work for schools in determining student majors and providing reports on these majors [2].

This study provides a solution for determining the recipients of village funds using the Weight Product method. Weight Product Method is one of the methods often used to solve the problem of decision making with many attributes or criteria (MADM) [3]. This method is more efficient than some other methods in solving the problem of decision making with many attributes or criteria (Multi Attribute Decision Making). The criteria used in this study include: Poverty rates, area, geographical difficulty, and infrastructure. So that the results obtained obtained aids for determining the recipient of funds with the proposed method will be objective by looking at the specified criteria [4]. The results can provide decisions in determining the receipt of village funds.

## 2. Research Methods

### 2.1 Metode WP (Weight Product)

The WP method is one of the MADM (Multi Attribute Decision Making) methods [5]. MADM method is a method of decision making based on several attributes. The concept of the problem is evaluating alternative  $m$   $A_i$  ( $i=1,2,...,m$ ) in a set of attributes or criteria  $C_j$  ( $j=1,2,...,n$ ), where each attribute is not interdependent with each other [6] [7]. This method makes a decision by determining the weight for each attribute [8] [9]. The WP method uses a normalization process, where the ranking of each attribute is raised first with the weight of the corresponding value attribute. This process is given in the following formula:.

$$S_i = \prod_{j=1}^n x_{ij}^{w_j} \quad (1)$$

with  $i = 1, 2, ..., m$ , where :

$S$  = stated alternative preferences,

$x$  = states the value of the criterion,

$w$  = states the criteria weights,

$n$  = states the number of criteria.

$w_j$  is a positive value for the profit attribute, and a negative value for the cost attribute.

## 2.2 Alternatif ( $A_i$ )

Alternative  $A_i$  with  $i = 1, 2, \dots, m$  is a number of different objects other than that it has the same opportunity to be chosen by the decision maker [10]. Data calculated by several villages that submitted proposals in the field of infrastructure activities in a number of 10 villages, namely: Geblagan, Gatak, Ngebel, Ngrame, Jetis, Jadan, Brajan, Gonjen, Pity, Twins, Relative preferences of each alternative are given as:

$$V_i = \frac{\prod_{j=1}^n X_{ij}^{w_j}}{\prod_{j=1}^n (X_j)^{w_j}} \quad (2)$$

dimana :

$V$  : Alternative preferences,  $X$  : Criteria value,

$w$  : Criteria weight.

The alternatives to be chosen are the top 5 that have the highest preference value..

## 2.3 Criteria ( $C_j$ )

To select a proposed priority village that has a proposed activity status "feasible" to receive BLM, then several decision-making criteria are needed [11].

C1: Compliance with the provisions on receiving village funds.

C2: Urge to be implemented.

C3: More useful for poor groups.

C4: Can be done by the community.

C5: The level of success and continuous development.

C6: Supported by existing resources.

The relationship data between alternatives and criteria is seen in TABLE I. These values are values given by TV for proposed activities proposed by alternative villages.

Alternatif ( $A_i$ )	Kriteria ( $C_j$ )					
	C1	C2	C3	C4	C5	C6
Geblakan	70	80	81	73	76	77
Gatak	77	45	80	80	66	87
Ngebel	79	90	82	81	80	79
Ngrame	78	80	90	84	80	80
Jetis	80	78	79	81	82	84
Brajan	80	85	82	81	79	83
Jadan	77	40	80	80	62	55
Gonjen	81	80	83	80	80	80
Kasihani	78	80	83	80	80	80
Kembaran	80	80	0,8	80	80	80

## 2.4 Bobot ( $w$ )

The weight is the value or level of relative importance of each criterion ( $C_j$ ) given by the decision maker, in this case TV [12]. Weight values are given as:

$$W = \{w_1, w_2, w_3, \dots, w_n\} \quad (3)$$

where is the value  $\sum w_j = 1$

### 2.5 Algoritma

The steps of analyzing the problem with the WP method are illustrated in the flow chart in Figure 1 below.

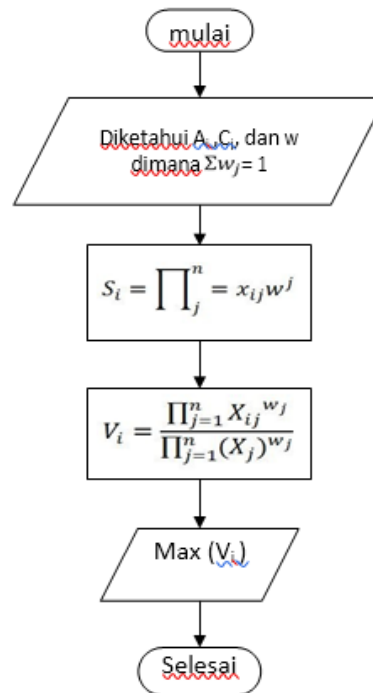


Figure 1. flowchart weight product method

The stages described by the flow chart in Figure 1 are explained as follows [13]:

- 1) Input data.  
Data entered, the data contained in Table 1. In addition, the weight determined by the TV is  $W = \{w_1, w_2, w_3, w_4, w_5, w_6\} = \{0.18; 0.22; 0.23; 0.2; 0.08; 0.09\} = 1$ . Then the values from the alternative village proposals based on their respective criteria are entered into the system.
- 2) Process  $S_i$ .  
This process is called the normalization process, the  $S$  vector value sought is the preference value for each alternative.
- 3) Process  $V_i$ .  
The process of finding vector  $V$  is used to make a ranking for each alternative.
- 4)  $V_i$  maksimum.  
Aiming to find the greatest value of the many alternatives or what is meant is, the largest alternative is the best alternative.

### 2.6 Entity Relationship Diagram

From the specified criteria and alternative data, the process carried out next is the database design of the proposed system. The picture below is a picture of the entity relationship diagram of the application.

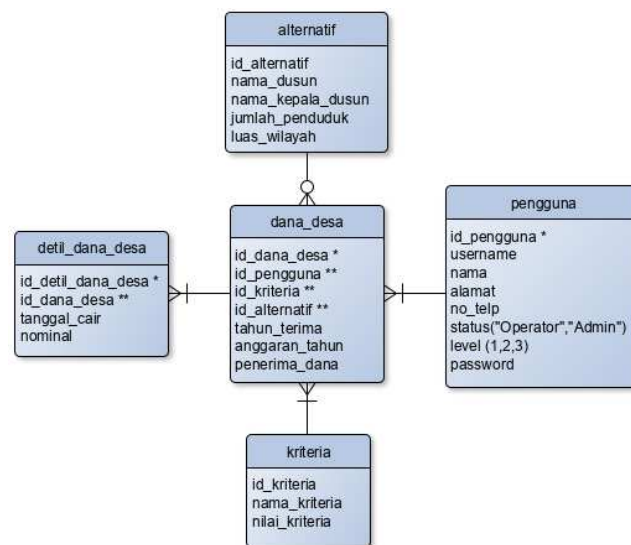


Figure 2 Entity Relationship Diagram of Application

### 2.7 Interface

From erd shown in the picture above, a prototype of the application was made.

## 3. Result and Discussion

### 3.1 The front page of the application

The front page of the application is the page that first appears when the application is run. This user validation will be performed on this front page. The components on this page have 2 components, namely: the content component and the button component. The content component on this front page is used to enter application user data which will later be matched with existing data in the database. The image below is the front page of the application.

SPK Penentuan Penerima Dana Desa

### Sistem Pendukung Keputusan Penentuan Penerima Dana Desa

User Name:

Password:

Login    Batal

Figure 3 main page of application

### 3.2 Administrator page

Administrator page is the page used by administrators to update criteria data, alternatives, and officer data.

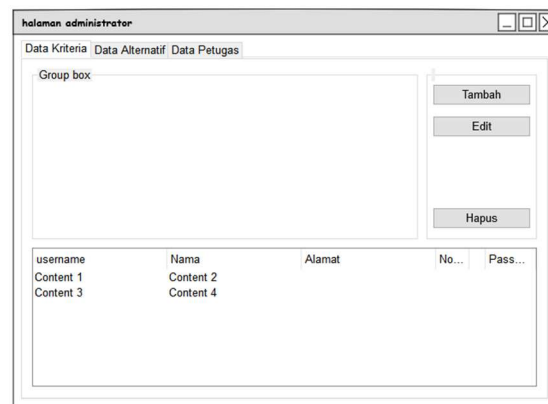


Figure 4 Administrator page

## 4. Conclusion

Village funds are funds used for village welfare. Determination of village funds should be done with a computing system. This is to avoid conflicts of interest and corrupt practices. A system is needed to enable the automation of determining the recipients of village funds. Many methods can be used to overcome these problems, one of which is the weight product. The system that will be built using the weight product method provides a solution for receiving village funds in the form of ranking.

## References

- [1] M. A. P. Muhammad Eko Atmojo, Helen Dian Fridayani, Aulia Nur Kasiwi, "Efektivitas dana desa untuk pengembangan potensi ekonomi berbasis partisipasi masyarakat di Desa Bangunjiwo Muhammad Eko Atmojo , Helen Dian Fridayani , Aulia Nur Kasiwi , Mardha Adhi Pratama Program Studi Ilmu Pemerintahan , FISIP Univeristas Muhammadiyah," *Sos. Polit. Humaniora*, vol. 5, no. 1, pp. 126–140, 2017.
- [2] J. D. Watts, L. Tacconi, S. Irawan, and A. H. Wijaya, "Village transfers for the environment: Lessons from community-based development programs and the village fund," *For. Policy Econ.*, no. December 2018, pp. 1–11, 2019.
- [3] D. M. Khairina, D. Ivando, and S. Maharani, "47-1-139-1-10-20160929," *J. Infotel*, vol. 8, no. 1, pp. 1–8, 2016.
- [4] J. Boonperm, J. Haughton, and S. R. Khandker, "Does the Village Fund matter in Thailand? Evaluating the impact on incomes and spending," *J. Asian Econ.*, vol. 25, no. 1, pp. 3–16, 2013.
- [5] N. S. Fitriyani, S. A. Fitriani, and R. A. Sukanto, "Comparison of weighted product method and technique for order preference by similarity to ideal solution method: Complexity and accuracy," *Proceeding - 2017 3rd Int. Conf. Sci. Inf. Technol. Theory Appl. IT Educ. Ind. Soc. Big Data Era, ICSITech 2017*, vol. 2018-January, pp. 453–458, 2018.
- [6] J. Kittur, "Optimal generation evaluation using SAW, WP, AHP and PROMETHEE multi - Criteria decision making techniques," *Proc. IEEE Int. Conf. Technol. Adv. Power Energy, TAP Energy 2015*, pp. 304–309, 2015.
- [7] L. Menkhoff and O. Rungruxsivorn, "Do village funds improve access to finance? Evidence from Thailand," *World Dev.*, vol. 39, no. 1, pp. 110–122, 2011.
- [8] I. Meutia and Liliana, "Pengelolaan Keuangan Dana Desa," *J. Akunt. Multiparadigma*, vol. 8, no. 2, pp. 336–352, 2017.
- [9] H. O. Maulana, I. M. Shofi, N. F. Rozy, and F. E. M. Agustin, "Application for determining mustahiq based on the priority using weight product method (case study: BAZIS DKI Jakarta)," *2017 5th Int. Conf. Cyber IT Serv. Manag. CITSM 2017*, 2017.
- [10] D. M. Khairina, M. R. Asrian, H. R. Hatta, C. Science, and I. Technology, "Recruitment Using Weighted Product Method," *Int. Conf. Inf. Tech., Comput. Electr. Eng.*, pp. 297–301, 2016.

- [11] A. Susanto, L. Latifah, Nuryasin, and A. Fitriyani, "Decision support systems design on sharia financing using Yager's fuzzy decision model," *2017 5th Int. Conf. Cyber IT Serv. Manag. CITSM 2017*, 2017.
- [12] A. Ahmadi and D. T. Wiyanti, "Implementasi Weighted Product ( WP ) dalam Penentuan Penerima Bantuan Langsung Masyarakat PNPM Mandiri Perdesaan," *Semin. Nas. Apl. Teknol. Inf.*, pp. 19–22, 2014.
- [13] F. V. Tangkumahat, V. V. J. Panelewen, and A. D. P. Mirah, "Dampak Program Dana Desa Terhadap Peningkatan Pembangunan Dan Ekonomi Di Kecamatan Pineleng Kabupaten Minahas," *Agri-Sosioekonomi*, vol. 13, no. 2A, p. 335, 2017.